

NASA's Space Launch System: Building A New Capability for Discovery

Designed to enable human space exploration missions, including eventually landings on Mars, NASA's Space Launch System (SLS) represents a unique launch capability with a wide range of utilization opportunities, from delivering habitation systems into the lunar vicinity to high-energy transits through the outer solar system. Substantial progress has been made toward the first launch of the initial configuration of SLS, which will be able to deliver more than 70 metric tons of payload into low Earth orbit (LEO). The vehicle will then be evolved into more powerful configurations, culminating with the capability to deliver more than 130 metric tons to LEO. The initial configuration will be able to deliver greater mass to orbit than any contemporary launch vehicle, and the evolved configuration will have greater performance than the Saturn V rocket that enabled human landings on the moon. SLS will also be able to carry larger payload fairings than any contemporary launch vehicle, and will offer opportunities for co-manifested and secondary payloads. Because of its substantial mass-lift capability, SLS will also offer unrivaled departure energy, enabling mission profiles currently not possible. The basic capabilities of SLS have been driven by studies on the requirements of human deep-space exploration missions, and continue to be validated by maturing analysis of Mars mission options. Early collaboration with science teams planning future decadal-class missions have contributed to a greater understanding of the vehicle's potential range of utilization. As this paper will explain, SLS is making measurable progress toward becoming a global infrastructure asset for robotic and human scouts of all nations by providing the robust space launch capability to deliver sustainable solutions for exploration.